



Locational Net Benefits Assessment & Distribution Infrastructure Deferral

Limitations, Opportunities & Next Steps

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LNBA Value Components

Value categories are refined and adjusted for local variation

System-wide Average or Location Specific Benefit Value layers

(Assessed as applicable to each layer)

- HV System Transmission
- + LV Transmission Territory
- + Sub-transmission Area
- + Distribution Planning Area
- + Distribution substation
- + Circuit
- + Line section
- + Transformer
- + Meter Load
- + BTM load

= **Total Stacked Value**

DERAC Components	
1	Energy
2	Losses
3	Generation Capacity
4	Ancillary Services
5	T&D Capacity
6	Environment
7	Avoided RPS

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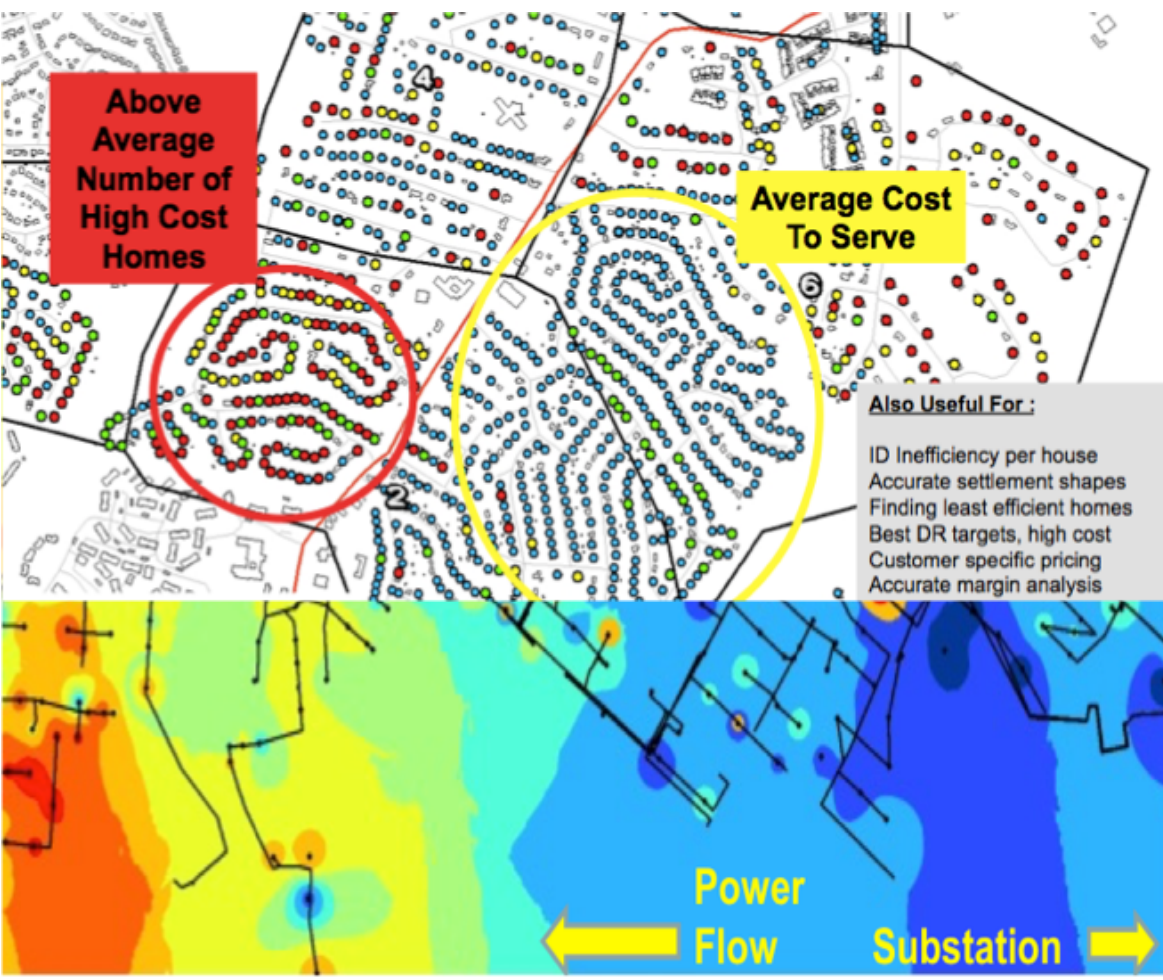
New /More Granular Components	
1	Distribution Capacity
2	Voltage and Power Quality
3	Reliability and Resiliency
4	Transmission Capital and Operating Expenditures
5	Flexible Resource Adequacy (RA) Procurement
6	Renewable Integration
7	Societal avoided costs
8	Public safety avoided costs

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PG&E Final Value Components	
1	Distribution Capacity
2	Voltage and Power Quality
3	Reliability and Resiliency
4	Transmission Capital and Operating Expenditures
5a	System or Local Area RA Procurement
5b	Flexible RA Procurement
6a	Generation Energy and GHG
6b	Energy Losses
6c	Ancillary Services
6d	RPS Procurement
7	Renewables Integration
8	Societal avoided costs
9	Public safety avoided costs

Key: ■ Distribution ■ Transmission ■ Generation ■ Societal

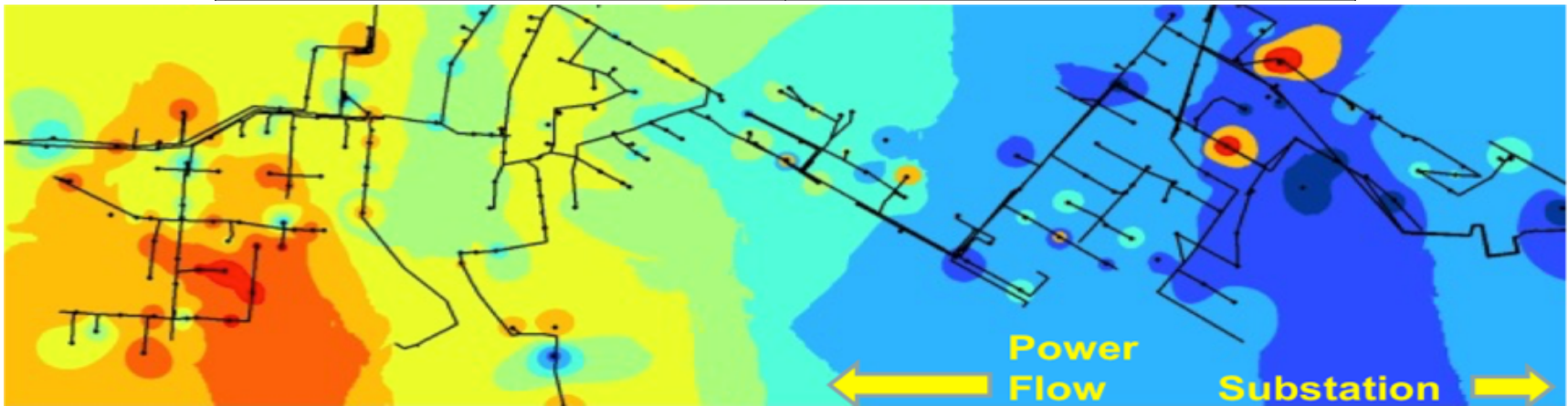
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ISO/ Market	1. Frequency regulation
	2. Spin
	3. Ramp
	4. Black start
	5. Real-time energy balancing
	6. Energy arbitrage
	7. Resource Adequacy
Generation	8. Intermittent resource integration: wind (ramp/voltage support)
	9. VER/ PV shifting, Voltage sag, rapid demand support
	10. Supply firming
Transmission / Distribution	11. Peak shaving: load shift
	12. Transmission peak capacity support (deferral)
	13. Transmission operation (short duration performance, inertia, system reliability)
	14. Transmission congestion relief
	15. Distribution peak capacity support (deferral)
	16. Distribution operation (volt/VAR support)
Customer	17. Outage mitigation
	18. Time-of-use (TOU) energy cost management
	19. Power quality
	20. Back-up Power

LNBA - Distribution Marginal Cost Impacts

	Grid Side	Supply Side	
Variable Costs	Voltage KVAR Power Factor Line Losses Limiting Factors	Ancillary Services Plant Following Wind/ Cloud Firming Current hour LMP	Time <i>Minutes</i> <i>Hours</i> <i>Months</i> <i>Years</i>
Fixed Costs / Capacity	Asset Protection Circuit Capacity Deferral Bank Capacity Deferral Future Congestion	Capacity Premium 10 Year LMP Forecasts Future Covariance	



Project Screening & Selection Process

Scoring Metrics	Features	Higher Viability
Screen 1: Technical (Which projects have DER options)	Four DER services: Capacity, Voltage, Reliability, Micro-grid	Thermal mitigation service
Screen 2: Project Timing (rules out many potential projects)	Sufficient lead time within planning cycle	3-5 years Allows for procurement & Contingency options
DER Attribute Requirements	DER capacity to deferral ratio (MW/MWh reduction, duration, & timing profile)	Lower DER capacity requirement & Higher siting potential
Project Timing Certainty	volatility in historic and forecast load growth	Nearer term need & Low volatility
Financial Assessment	Higher deferral value	Expensive projects/DER capacity
Customer Composition (Market Assessment)	High load reduction to participant ratio	Customers with large loads
Distribution Topology	Geographic and customer range	Larger area & number of potential participants (substation needs)